Declining Use Rates of Revascularization for Medicare Patients
Is This a Real Trend?

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The report by Culler and associates in this issue of Circulation provides useful information about the trends and outcomes of coronary revascularization procedures currently being performed in the United States. Data acquisition for this analysis of coronary revascularization activity from 2008 through 2012 required tedious mining of 2 complex data sets maintained by the Centers for Medicare and Medicaid Services. In addition to the Medicare Provider Analysis and Review file, which contains all inpatient claims for Medicare beneficiaries, they reviewed the Medicare Outpatient File, which contains claims for “nonadmission” services, specifically data on outpatient procedures. This latter review was necessary because many percutaneous coronary interventions (PCIs) are now done in acute hospital settings but with patients classified as outpatients or hospitalized but under observation status. An obvious limitation of this report of current revascularization trends is the fact that only Medicare patient data were analyzed. Coronary revascularizations of Medicare beneficiaries, however, are believed to represent a modest majority of such procedures and to reliably reflect total revascularization activity in the United States.

This report presents an exhaustive review of all revascularizations performed on Medicare beneficiaries who underwent either PCI or coronary artery bypass grafting (CABG) during the 5-year study period. It is unclear why the authors refer to primary and secondary PCI and CABG. This distinction appears to be meaningless for PCI patients. In addition, they report 90-day postdischarge mortality rates but do not describe how this late postdischarge mortality information was obtained and validated. The principal value of the report is the patient volume information and the analysis of total coronary revascularization procedures done during the recent 5-year period, along with likely accurate early postprocedure mortality data on all Medicare program patients having PCI or CABG surgery during this time. Analysis of the PCI data is straightforward, whereas the CABG data include isolated CABG operations and combined CABG-valve surgery procedures. Combined CABG-valve procedures increased during this 5-year interval. For an undetermined number of these patients, the principal indication for surgery was the condition of the heart valve. In addition, 3% to 4% of CABG patients had PCI performed during the same admission, which suggests that the PCI revascularization procedure may have been ineffective or complicated and may have required immediate CABG surgery.

The well-documented decline in CABG surgery that began nearly 20 years ago as PCI case volume increased dramatically continued during this 5-year period. This report notes a steady annual reduction in CABG procedures that amounted to nearly 5% fewer CABG operations in both 2011 and 2012. Of particular note is the substantial decline in the incidence or use of CABG surgery in the Medicare population. In 2008, there were 3.1 CABG surgeries performed per 1000 Medicare beneficiaries, whereas by 2012, the rate of CABG surgeries per 1000 Medicare beneficiaries in US hospitals had declined to 2.4 per 1000 Medicare beneficiaries. There were 18,380 fewer CABG procedures performed in 2012 than in 2008, with only 121,744 total Medicare CABG procedures reported in 2012.

On the other hand, PCI procedure volume peaked in 2010, whereas PCIs declined modestly in 2011 and 2012 by ≈3% each year. In the peak year of 2010, there were 434,000 PCI procedures reported for Medicare beneficiaries. By 2012, total PCI volume had declined to 402,000 reported cases, an actual reduction of 32,000 procedures. As seen with CABG procedures, however, a more important trend identified in this report is the decline in the use of PCI when normalized to the total Medicare patient population. PCI declined over this 5-year period from 9.3 to 7.9 procedures per 1000 Medicare beneficiaries. Total Medicare revascularizations, both PCI and total CABG procedures, declined over the last 2 years of the study by >4%/y, amounting to ≈45,000 fewer procedures in 2012. With PCI and CABG procedures combined, the rate of revascularization fell to 10.31 procedures per 1000 Medicare beneficiaries in 2012, down from 12.42 patients per 1000 Medicare beneficiaries 5 years earlier in 2008.

Despite the reduction in the number of CABG surgeries being performed, rates of surgical mortality in all CABG categories decreased in this 5-year period. The early mortality rate for patients undergoing CABG-only surgery was 2.27% in 2012 compared with 2.56% 5 years earlier. The same trends in lower mortality rates are reported in other categories of CABG surgery, patients undergoing PCI and CABG on the same admission, and patients undergoing combined CABG surgery.
and valve surgery. Also noteworthy is the increasing percentage of patients having combined CABG and valve surgery within the CABG population. In 2012, patients undergoing combined CABG and valve surgery made up nearly 30% of the CABG patient population. Despite this growing percentage of technically more complex CABG procedures in patients with higher predicted operative risks, the surgical mortality rates for the total CABG surgery population decreased over the 5 years from 3.70% to 3.22%.

Mortality rates among PCI patients increased modestly over the 5 years of the study period, from 1.67% for all PCI patients in 2008 to 1.94% in 2012. This increased mortality rate was seen only in the PCI patients who were admitted. Among these PCI inpatients, the percentage of those with a diagnosis of acute myocardial infarction increased from 35% in 2008 to nearly 50% in 2012. Even among a slightly smaller total population of PCI patients in 2012 compared with earlier years, there were nearly 16,000 more PCI patients with a diagnosis of acute myocardial infarction in that year compared with 2008. It is important to note that the inpatient PCI population accounted for the increase in total PCI mortality rates and that the subgroup of ST-segment–elevation myocardial infarction (STEMI) patients had the highest mortality rates. In fact, patients with STEMI receiving either PCI or CABG surgery experienced mortality rates of 2.9%.

The authors emphasized the increasing shift from inpatient to nonadmission PCI procedures observed over this 5-year period. In fact, this increase in nonadmission PCIs to >10,000 in 2012 has been more than offset by the observed reduction in inpatient PCI procedures. As expected, 98% of the nonadmitted PCI patients presented without evidence of myocardial infarction, whereas nearly 50% of inpatient PCIs in 2012 were performed on patients with acute myocardial infarction. This trend to a higher percentage of outpatient PCI procedures is likely to have an economic impact on traditional hospital systems that continue to perform all PCIs in the same catheterization laboratories with patients recovering in traditional inpatient units. Strictly enforced Centers for Medicare and Medicaid Services guidelines defining inpatient status result in lower reimbursement rates for short-stay PCI patients even though the total care provided during the hospital stay in the same catheterization laboratories and hospital recovery units may be identical to the care provided to inpatients. Length of stay is shorter, but the costs associated with episode of care for the nonadmitted patient may be only marginally lower.

Although physicians and hospital administrators share the goal of high-quality care at the lowest possible cost, many hospital systems are struggling with how to reduce expenses associated with outpatient PCIs done in the traditional inpatient setting. In addition, as questioned above, the reported increase in facilities performing nonadmission PCIs during the 5-year period may not be solely the result of an increase in free-standing interventional cardiology facilities. This important distinction between acute care hospitals performing nonadmission PCIs and free-standing outpatient facilities performing PCIs is not clarified by the authors in this report. This information could be ascertained by comparing or cross-walking facility identifiers in the Medicare Provider Analysis and Review and Outpatient Medicare files. An unresolved challenge for many health systems is whether or how to reengineer their patient care pathways and even facilities to optimally provide high-risk and high-technology–dependent services such as PCIs for patients who do not qualify for or require inpatient care. Health systems have been successful in eliminating preservice hospital admissions for virtually all patients having even complex elective surgical procedures. A similar adaptation is necessary in the postprocedure care of many PCI patients who do not meet Centers for Medicare and Medicaid Services criteria for hospital admission.

As noted, the authors do not indicate the source of the 90-day mortality information. Assuming the accuracy of these data, there appears to be a modest trend toward an increase in all-cause mortality rates among PCI patients who present with acute myocardial infarction. The 90-day postdischarge mortality rates for both PCI and CABG procedures reported in this article confirm the significant impact of an acute myocardial infarction, in particular STEMI, on late 90-day mortality rates and on early outcomes. It is somewhat surprising, however, that the total number of rescue PCI procedures, acute revascularization procedures undertaken acutely in patients presenting with STEMIs, increased only modestly, from 58,180 in 2008 to 60,198 in 2012. With programs such as the American Heart Association’s Mission: Lifeline and the American College of Cardiology’s Acute Coronary Treatment and Intervention Outcomes Network (ACTION) that have promoted target-vessel revascularization of patients with STEMI, a greater increase in emergency PCIs would be expected during this 5-year period.

When speculating on future trends for coronary revascularization in Medicare patients, the authors suggest that, despite the current decline in total revascularizations, there likely will be an increase in revascularizations again “in the near future.” They base this prediction on the demographic impact of the “baby boomer” generation becoming Medicare beneficiaries. An alternative conclusion from this report, however, is that the declining rates of revascularization either by PCI or CABG seen clearly over this recent 5-year period may predict a continued decline in total Medicare revascularizations even in an expanding Medicare population. It would require actuarial techniques to plot the declining use trends in revascularizations against expanding numbers of Medicare beneficiaries. It is quite possible, however, on the basis of clear treatment trends favoring noninvasive treatments, appropriate use initiatives, palliative care, and patient empowerment programs, that a decline in revascularization for Medicare patients, as observed in this analysis, portends a continued reduction in the future. Total revascularizations declined 8% during this period. More significantly, the use of revascularization, either PCI or CABG, declined from 12.42 to 10.31 per 1000 Medicare beneficiaries in 2012. This declining use may be the most important finding in this report and the specific trend indicator that requires careful documentation in future analyses.

Disclosures

None.
References


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